CLAIMS

1. A process for creating a composite decorative surface on a substrate, comprising the steps of:

(a) forming an electrostatic latent image on a transfer surface, said surface having charged regions of a first polarity and uncharged regions, said regions defining said latent image;

(b) placing a plurality of substantially rod-shaped components in a feeder device and orienting said rod shaped components so as to be substantially perpendicular to said transfer surface;

(c) placing an electrostatic charge on said components such that tips of said rod-shaped components adjacent said transfer surface have an electrostatic charge of a second polarity;

(d) feeding said components toward the transfer surface while the transfer surface is in motion so that said rod shaped components become affixed to the charged regions of the transfer surface by electrostatic attraction; and,

(e) providing a substrate having an adhesive coating and placing either of said substrate or said transfer surface in motion relative to one another such that said components are transferred from the transfer surface to the substrate in a pattern determined by the latent image.

2. The process of claim 1 in which the transfer surface contains a photoconducting layer and the

electrostatic latent image is produced by optical projection of a preselected image upon it.

3. The process of claim 1 wherein the transfer surface contains a photoconducting layer and the latent image is written by one or more focused light sources directed upon said transfer surface to produce a preselected pattern.

4. The process of claim 1 wherein the transfer surface comprises a dielectric material and the electrostatic latent image is written upon said surface by delivering an electrostatic charge to said surface from one or more electrodes.

5. The process of claim 1 wherein the transfer surface is a dielectric material and the electrostatic latent image is written by one or more electron beams.

6. The process of claim 1 wherein the latent image is formed on the transfer surface by plasma writing.

7. The process of claim 1 wherein the rod-shaped components are wood fibers.

8. The process of claim 1 wherein the substrate is a wood-fiber composite.

9. The process of claim 1 wherein the substrate is wood.

10. The process of claim 1 wherein the transfer surface is a flexible film.

11. The process of claim 1 wherein the transfer surface is disposed on a rotating drum.

12. The process of claim 10 wherein the flexible film is shaped to conform to said substrate by first placing it in proximity to said substrate and then conducting a fluid onto the back of the film so as to force the rod-shaped components on the film to touch the substrate.

13. The process of claim 1 wherein the transfer surface is in the shape of a cylinder and the substrate is flat.

14. The process of claim 1 wherein the transfer surface contains a photoconducting layer and wherein said rod-shaped components are transferred from the transfer surface to the substrate by illuminating the transfer surface while said rod shaped components are in close proximity to the substrate.

15. The process of claim 1, further including as step (f), the step of forming a composite matrix about the rod-shaped components on the substrate by nebulizing composite matrix source materials and spraying a mist comprising said materials onto the substrate.

16. The process of claim 15 wherein said mist and said substrate are charged electrostatically with opposite polarity charges, respectively, whereby to create electrostatic attraction between said substrate and said rod-shaped components.

17. The process of claim 1 wherein a patterned substrate as obtained in step (e) is subjected to additional process steps including repeating steps (a) through (e).

18. The process of claim 1 wherein said substrate includes a plurality of composite layers, a top layer comprising an intended layer and further including the step of removing said intended layer from said composite layers following the completion of step (e).

19. The process of claim 18 wherein the substrate is coated with Teflon or other similar material.

20. The process of claim 1, further including the step of applying an electrostatic field across said transfer surface after the execution of step (d) whereby to increase the tendency of the rod-shaped components to stand perpendicular to the transfer surface.

21. The process of claim 15, further including as step (g), the step of causing said rod shaped components to tip at an angle relative to said substrate.

22. The process of claim 21 wherein step (g) is accomplished by executing step (f) with the composite matrix material in liquid form with a horizontal component of application force.

23. The process of claim 21 wherein step (g) is accomplished by brushing the rod-shaped components on the adhesive substrate prior to formation of the composite matrix about them.

24. The process of claim 21 wherein step (g) is accomplished by applying electrostatic forces produced by narrow electrodes disposed in the vicinity of the substrate after step (f).

25. The process of claim 1 wherein the rod-shaped components are oriented prior to attachment to the

electrostatic latent image on the transfer surface by directing a fluid through said components in a desired direction.

26. The process of claim 1 wherein the substrate is a polymer or plastic.

27. The process of claim 1 wherein the substrate is a fiberglass.

28. The process of claim 1 wherein the substrate is cellulose, hemicellulose, protein, saccharide, or a combination thereof.

29. The process of claim 1 wherein the substrate is leather and a product produced according to said process is artificial fur.

30. The process of claim 1 wherein the substrate is a textile and a product produced according to the process is a carpet.

31. A man-made, dielectric, composite material layer thicker than 1 mm and thinner than 30 mm containing fibers or other rod-shaped dielectric members that emerge on the surfaces in a pattern that varies laterally to provide a decorative effect produced according to the process of claim 1.

32. The composite material layer of claim 31 wherein the fibers are cellulose fibers held in a matrix material of lignin, a polymer, or a plastic.

33. A process for the creation of a dielectric, composite decorative surface having a thickness greater than 1 mm on a substrate comprising the steps of:

(a) applying an adhesive coating to the surface of the substrate;

(b) forming an electrostatic latent image on the surface of said substrate;

(c) attaching to said substrate one end of each of a plurality of dielectric aligned, flexible rod-shaped components in a pattern determined by the latent image on the substrate; and,

(d) growing a dielectric composite matrix around the rod-shaped components upon the substrate.

34. The process of claim 33 wherein the electrostatic latent image is written by means of one or more electron beams.

35. The process of claim 33 wherein the electrostatic latent image is written by means of a plasma writing system.

36. The process of claim 33 wherein step (b) is accomplished by the application of charged drops of adhesive by an array of drop-on-demand, piezoelectric ink-jet nozzles.

37. The process of claim 36 wherein steps (a) (b) and (c) are repeated prior to step (d).

38. A product produced according to the process of claim 33 having a plush surface.

39. The process of claim 33, further including prior to step (c) the step of impressing upon a plurality of rod-shaped dielectric components an electrostatic charge.